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ABSTRACT

The paper describes the development and use of the Child Behavior Profile, a measure of behavioral problems and competencies standardized for each sex at ages 4 to 5, 6 to 11, and 12 to 16. Cluster analysis is explained to have produced six reliable profile types for boys 6-11 years old; five reliable profile types for boys 12 through 16 years old; six types for girls aged 6 through 11; and seven for girls 12 through 16. Followup data is cited to show that the Child Behavior Profile can be used in research on the relationships between child characteristics and the effectiveness of various services. (CL)

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CHILD BEHAVIOR PROFILE PATTERNS OF CHILDREN REFERRED FOR CLINICAL SERVICES

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CHILD BEHAVIOR PROFILE PATTERNS OF CHILDREN REFERRED FOR CLINICAL SERVICES

The development of appropriate helping services for disturbed children and youth has been greatly handicapped by the lack of standardized procedures for assessing behavioral problems and competencies. Without such procedures, it is difficult to evaluate the effectiveness of particular interventions and to evolve a basis for optimally matching interventions to the needs of individual children in a prescriptive fashion. As a means for obtaining standardized descriptions of behavioral problems and competencies, we have developed the Child Behavior Profile, which consists of scales of behavioral problems and competencies scored from the Child Behavior Checklist. The Checklist consists of 118 behavior problems and 20 social competence items designed to be reported by parents and parent surrogates. A parallel instrument has also been developed for teacher reports.

To reflect age and sex differences in the distribution of behaviors, separate editions of the Profile are standardized for each sex at ages 4 to 5, 6 to 11, and 12 to 16. We will confine this report to findings for children aged 6-16, the groups seen most frequently in child mental health settings. The Profile includes three social competence scales designed to reflect school performance and involvement in activities and social relationships. The social competence scales comprise the same items for each edition of the Profile, but the behavior problem scales have been derived separately for each edition through factor analysis of Checklists filled out by parents of 450 children of each age and sex group who had been referred for mental health services. Second-order factor analyses have shown that the first-order behavior problem scales form two broad band groupings that we have designated as Internalizing and Externalizing. After the scales were formulated for

each edition of the Profile, norms were constructed by computing normalized T scores from Checklists filled out by 1400 randomly selected parents of normal children. Profiles are available in computerized and handscored versions, of which the handout is an example for 6- through 11-year-old boys. Reliability and validity data have been presented elsewhere (Achenbach, 1978; Achenbach & Edelbrock, 1978).

The Profile serves as a standardized description of reported behavior and can be used to reflect changes in reported behavior over time and in response to interventions. In addition, children can be grouped according to similarities in their Profile patterns for purposes of research on etiology, epidemiology, prognosis, and the differential effectiveness of various services.

To identify Profile patterns, we have performed hierarchical cluster analyses of Profiles obtained by children referred for mental health services. We used a centroid clustering algorithm with correlation as the measure of similarity. As shown in slide 1, this clustering method first computes the Q-correlations

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Slide 1

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between all of the subjects' Profiles. The Q-correlation is a measure of similarity of Profile shapes and is obtained by calculating the correlation between two subjects' scores on the scales of the Profile. Next, the two subjects whose Profiles have the highest Q-correlation are located and combined into one cluster. The Profiles in the cluster are then replaced by their centroid, which is the profile created by computing the average score of the cluster members for each scale in the Profile. On the next step, the Q-correlations between all of the Profiles are recomputed with the newly created cluster centroid treated just like the Profile of a single subject. In each

cycle the two Profiles that have the highest Q-correlation are located, combined into a cluster, and replaced by their centroid. As cycles proceed, larger and larger clusters are formed and combined in a hierarchical manner. The result is a hierarchical clustering of all Profiles, in which groups of subjects having similar Profile shapes and the hierarchical relationships between the groups can be identified.

This clustering method was used because it was found to be the most accurate of several methods in Monte Carlo studies with data similar to the data provided by the Child Behavior Profile (Edelbrock, 1978). The use of correlation as the similarity measure means that the Profile types are defined primarily by the patterns of scores, rather than the elevation of scores. Clinical norms rather than norms based on normal children are used in clustering, because we wish to maximally differentiate among clinically referred children.

For each age and sex group, Profile types that replicated across two samples of 200 Profiles each were retained. The criterion for replication of a Profile type was a significant correlation between a cluster centroid obtained in one sample and a cluster centroid obtained in the other sample. A significant correlation between cluster centroids obtained in different samples indicated that the pattern of scores on the Profile was shared by a group of children in each sample and that the Profile type was reliable.

Using this procedure, six reliable Profile types were obtained for boys aged 6 through 11. These Profile types are distinguished by exceptionally high scores on (1) the Schizoid, Depressed, and Uncommunicative scales, (2) the Somatic Complaints scale, (3) the Schizoid and Obsessive-Compulsive scales, (4) the Depressed, Social Withdrawal, and Aggressive scales, (5) the Delinquent scale, and (6) the Hyperactive scale.

These names simply reflect the high points of the Profile types. It is

important to note that each Profile type is defined by its entire pattern of scores on the Profile. The next three slides show the patterns of scores for three Profile types, including (1) the Schizoid Obsessive-Compulsive Profile type, (2) the Depressed, Social Withdrawal, Aggressive Profile type, and (3) the Hyperactive Profile type.

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Slides 2,3,4

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The hierarchical relationship between these Profile types was found to replicate across samples. The first three types were combined into a cluster that represented an Internalizing pattern of scores, characterized by high scores on the Internalizing scales and low scores on the Externalizing scales. The last two types were combined into an Externalizing cluster, characterized by high scores on the Externalizing scales and low scores on the Internalizing scales. The remaining type represents a mixed Profile pattern with high scores on both Internalizing and Externalizing scales, and it did not combine reliably with either the Internalizing or Externalizing clusters.

To determine the relative distribution of these Profile types, the Profiles of 798 boys seen in a wide variety of outpatient mental health facilities were classified according to their similarity to the six replicated Profile types. To do this, the correlations between each boy's Profile and the centroids of the replicated Profile types were calculated. Each boy was then classified according to the Profile type he correlated most highly with. Boys having a total score of less than 25 on the Child Behavior Checklist were excluded, since their scores generally fall within the normal range and their Profile patterns are unreliable for purposes of classification. The percentages of

boys classified by the various Profile types are shown in Slide 5.

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Slide 5

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Using the same procedure, five reliable Profile types were found for boys aged 12 through 16. The Profile types were distinguished by high scores on (1) the Hostile Withdrawal and Immature scales, (2) the Schizoid, Somatic Complaints, and Uncommunicative scales, (3) the Hyperactive and Obsessive-Compulsive scales, (4) the Delinquent scale, and (5) the Hyperactive, Immature, and Aggressive scales. The distribution of clinically-referred boys classified by these Profile types is shown in Slide 6.

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Slide 6

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Six reliable Profile types were found for girls aged 6 through 11 and were distinguished by high scores on (1) the Depressed and Social Withdrawal scales, (2) the Schizoid-Obsessive scale, (3) the Somatic Complaints scale, (4) the Sex Problems scale, (5) the Aggressive and Cruel scales, and (6) the Delinquent scale. The distribution of clinically-referred girls classified by these Profile types is shown in Slide 7, which also shows the hierarchical relationship between these Profile types.

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Slide 7

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Seven reliable Profile types were obtained for girls aged 12 through 16. These Profile types are distinguished by high scores on (1) the Schizoid scale,

(2) the Immature-Hyperactive scale, (3) the Anxious-Obsessive scale, (4) the Somatic Complaints scale, (5) the Depressed and Delinquent scales, (6) the Aggressive, Cruel, and Delinquent scales, and (7) the Delinquent scale. The distribution of girls classified by these Profile types is shown in Slide 8.

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Slide 8

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To assess the stability and prognostic correlates of Profile patterns, we have conducted 6-month and 18-month follow-ups of children seen in three outpatient clinics. Although there was a general tendency for the number of reported behavior problems to decline, Q correlations between initial and follow-up Profiles were statistically significant, ranging from an average of .73 for the 6-month follow-ups to an average of .59 for the 18-month follow-ups. In addition, when children's intake Profiles were classified according to the replicated Profile types, the centroids of the corresponding intake and follow-up groups showed an average correlation of .89 with one another over the 6-month follow-up period and .76 over the 18-month follow-up period. The shapes of Profile patterns thus remained quite stable for these groups over the course of treatment.

In analyzing the relationships between Profile types and changes in reported behavior problems, we have found that children having certain Profile types generally showed marked declines in problems, whereas children having other Profile types did not show these declines. For example, as shown in Slide 9, 6- to 11-year old boys who initially manifested the Schizoid-Depressed

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Slide 9

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Uncommunicative pattern declined substantially in behavior problems reported at follow-up 6 months later, whereas boys who initially manifested the Delinquent pattern showed a slight increase. The interaction between Profile type and change in reported problems was significant at $p < .05$, with no differences in age, race, socioeconomic status, or number of treatment sessions being related to this outcome.

Interactions of this type indicate that children differing in their patterns of reported behavior problems differ in their response to current mental health services. This also illustrates how the Child Behavior Profile can be used in research on the relationships between child characteristics and the effectiveness of various services. Children can be classified at intake according to the Profile types reported here, and their response to various treatment alternatives can then be evaluated, preferably by an experimental design. By following up children with the Child Behavior Checklist and other measures based on teacher, parent, clinician, and self-reports, changes in children having similar patterns of problems, but receiving different treatments can be compared. This kind of assessment of type-of-child by type-of-treatment interactions is essential for improving the prescriptive basis for mental health services and for identifying children who do not benefit from services currently being offered.

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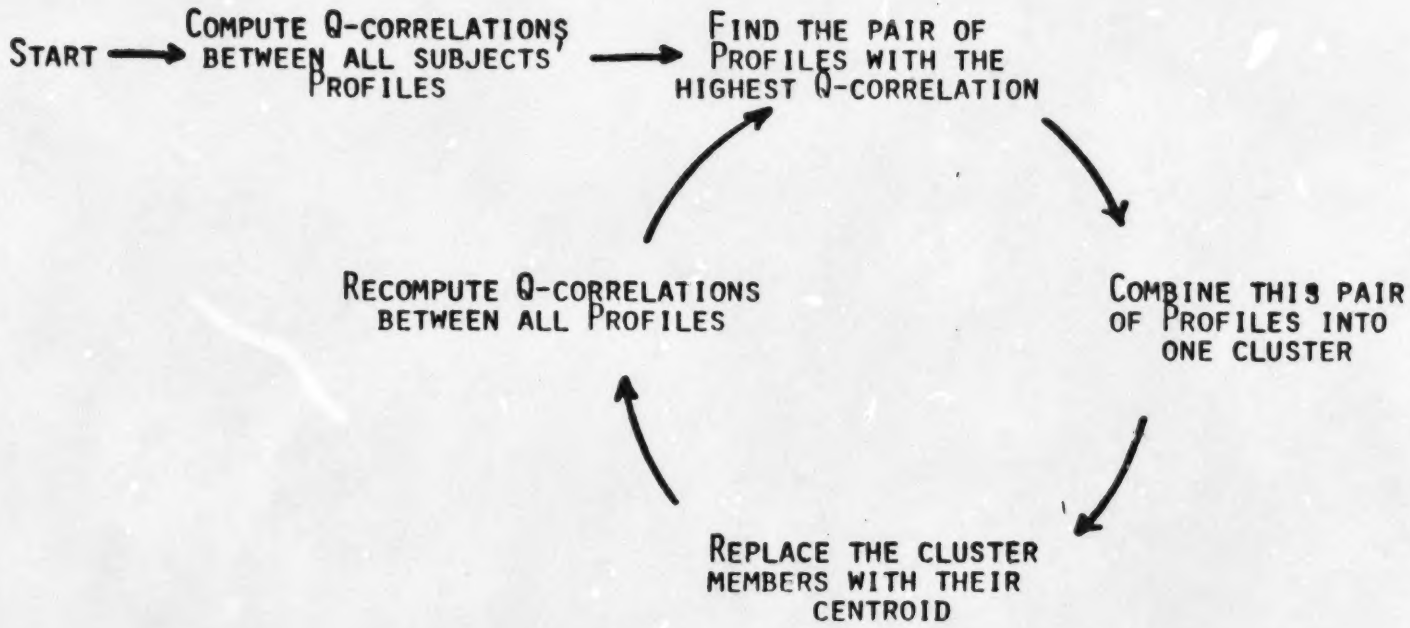
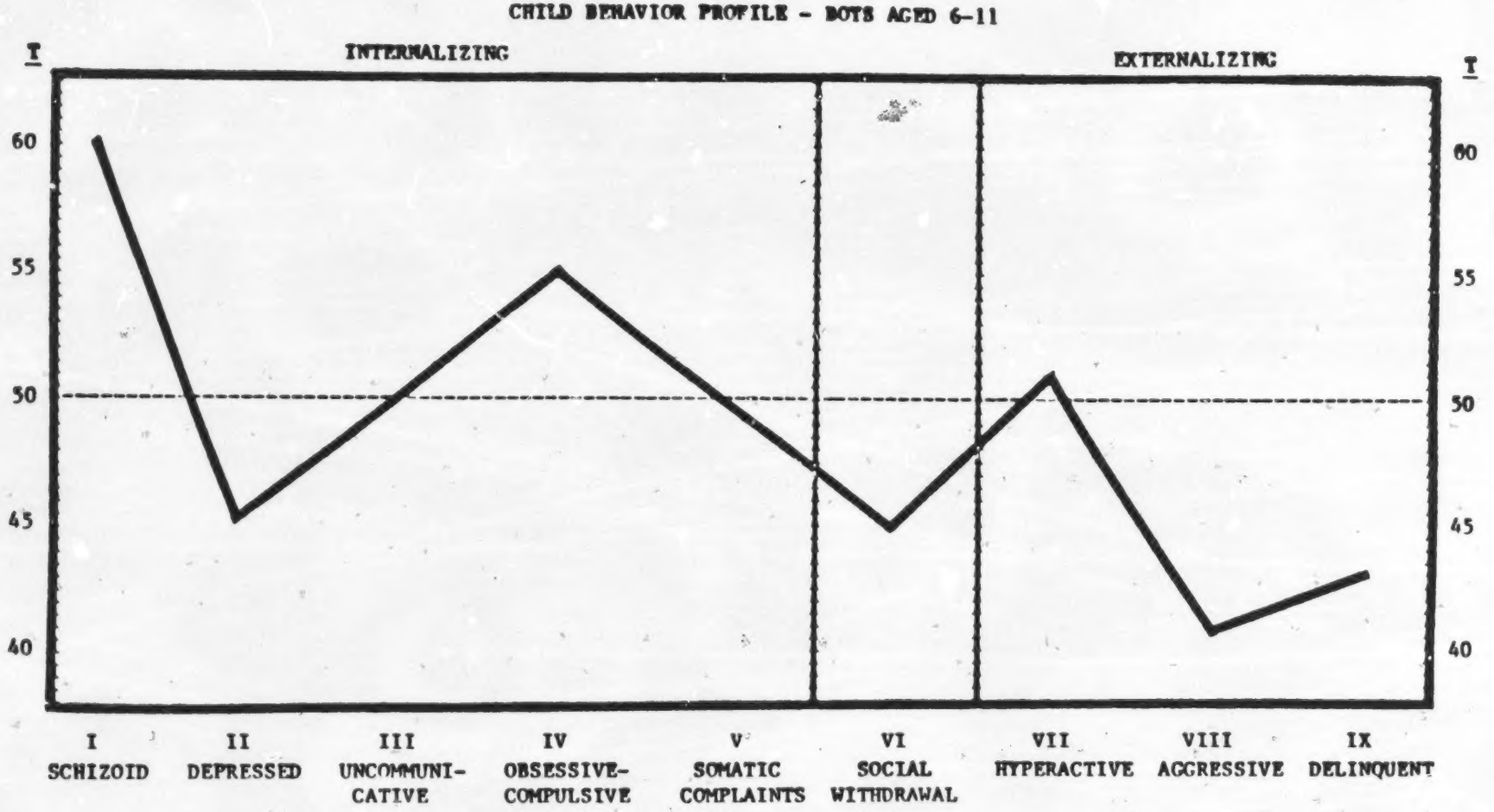
Achenbach, T.M., and Edelbrock, C.S. The Child Behavior Profile: II. Boys Aged 12-16 and Girls Aged 6-11 and 12-16. Journal of Consulting and Clinical Psychology, in press.

Edelbrock, C. Comparing the Accuracy of hierarchical clustering algorithms: The problem of classifying everybody. Paper presented at the Classification Society meetings, Clemson, S.C., May, 1978.

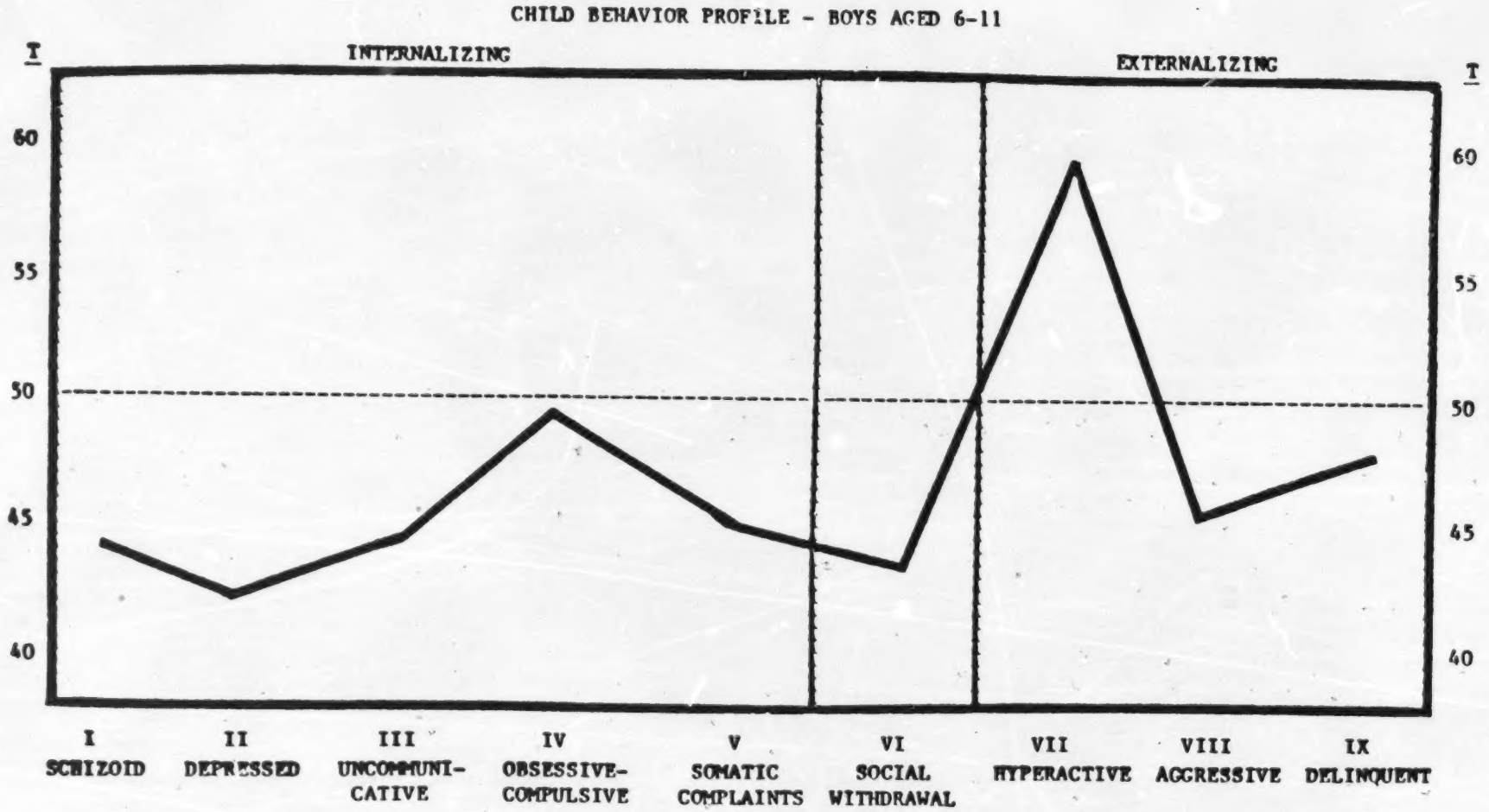

START
COMPUTE Q-CORRELATIONS BETWEEN ALL SUBJECTS' PROFILES
FIND THE PAIR OF PROFILES WITH THE HIGHEST Q-CORRELATION
COMBINE THIS PAIR OF PROFILES INTO ONE CLUSTER
REPLACE THE CLUSTER MEMBERS WITH THEIR CENTROID
RECOMPUTE Q-CORRELATIONS BETWEEN ALL PROFILES

Slide 1. Steps involved in the centroid clustering algorithm.



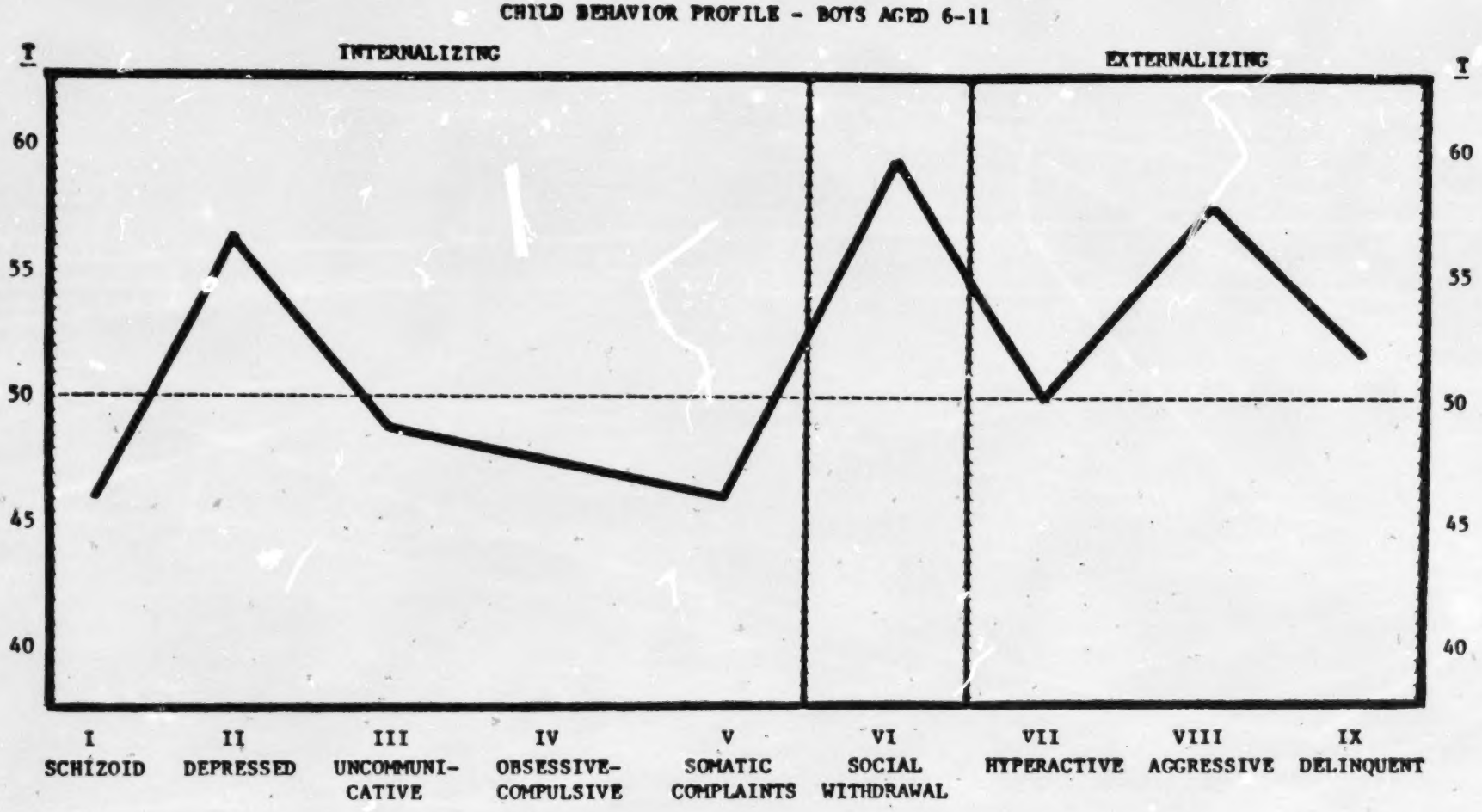
SCHIZOID OBSESSIVE-COMPULSIVE

Slide 2. The "Schizoid Obsessive-Compulsive" Profile type for boys aged 6-11.



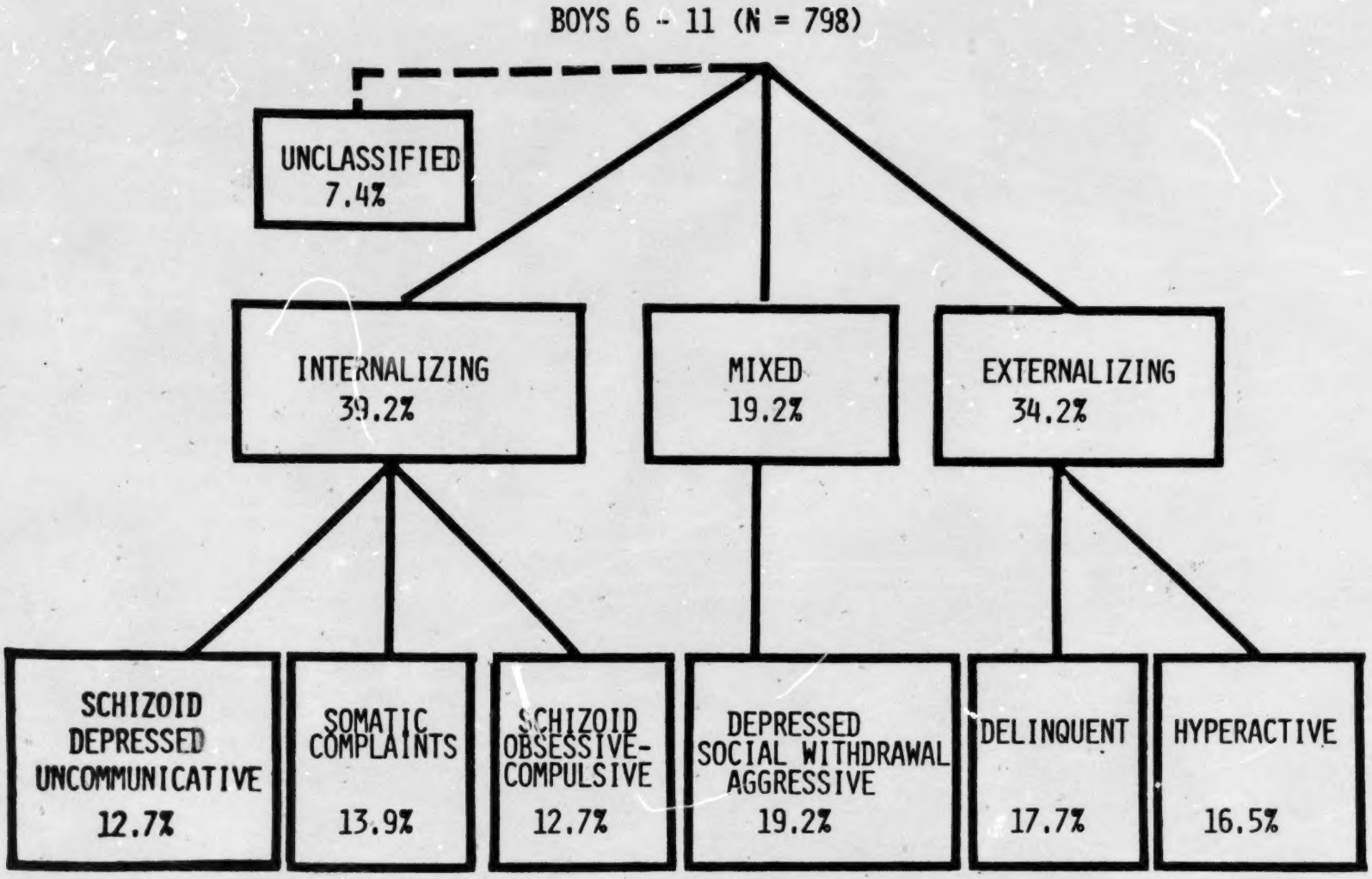
HYPERACTIVE

Slide 3. The "Hyperactive" Profile type for boys aged 6-11.

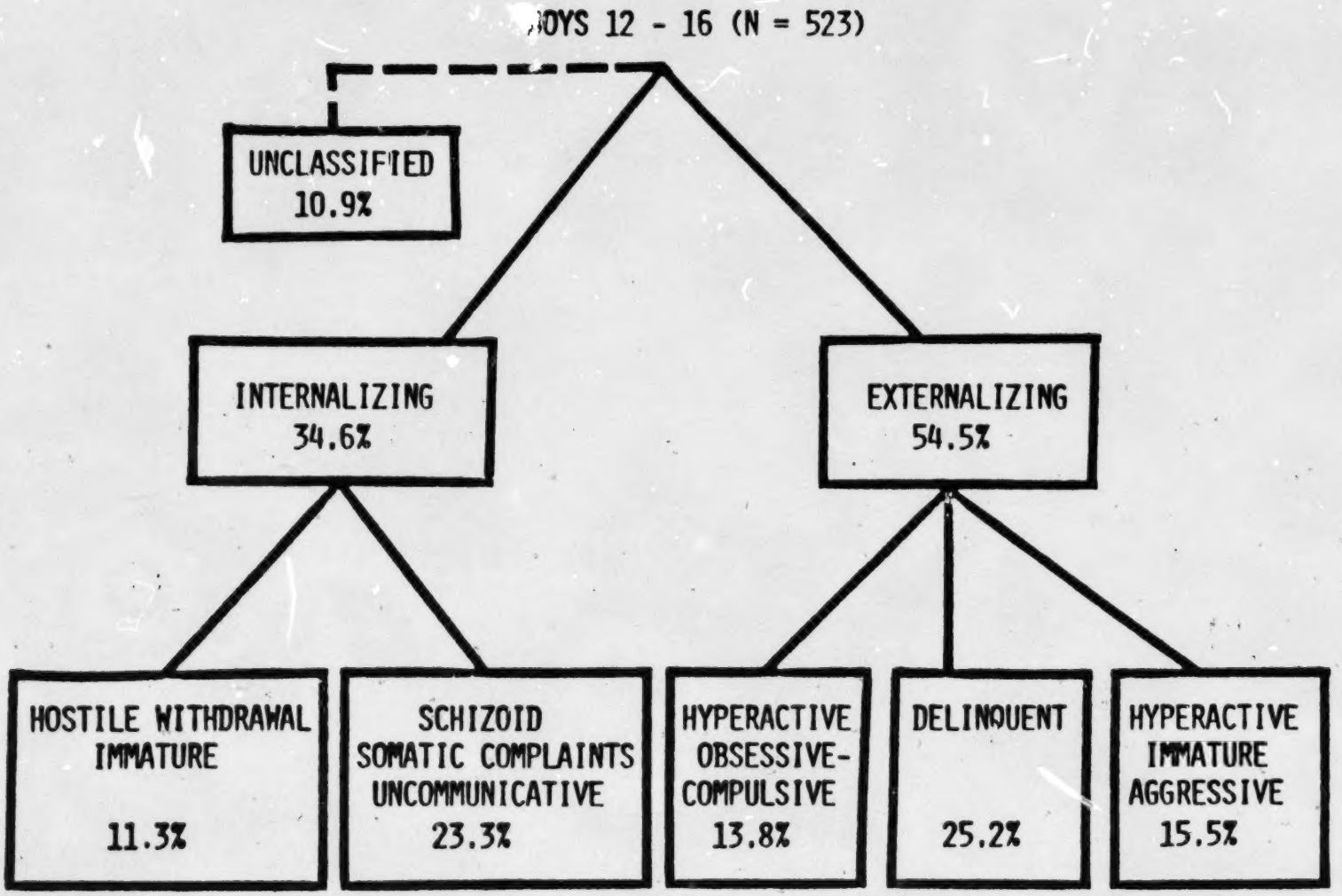


DEPRESSED SOCIAL WITHDRAWAL AGGRESSIVE

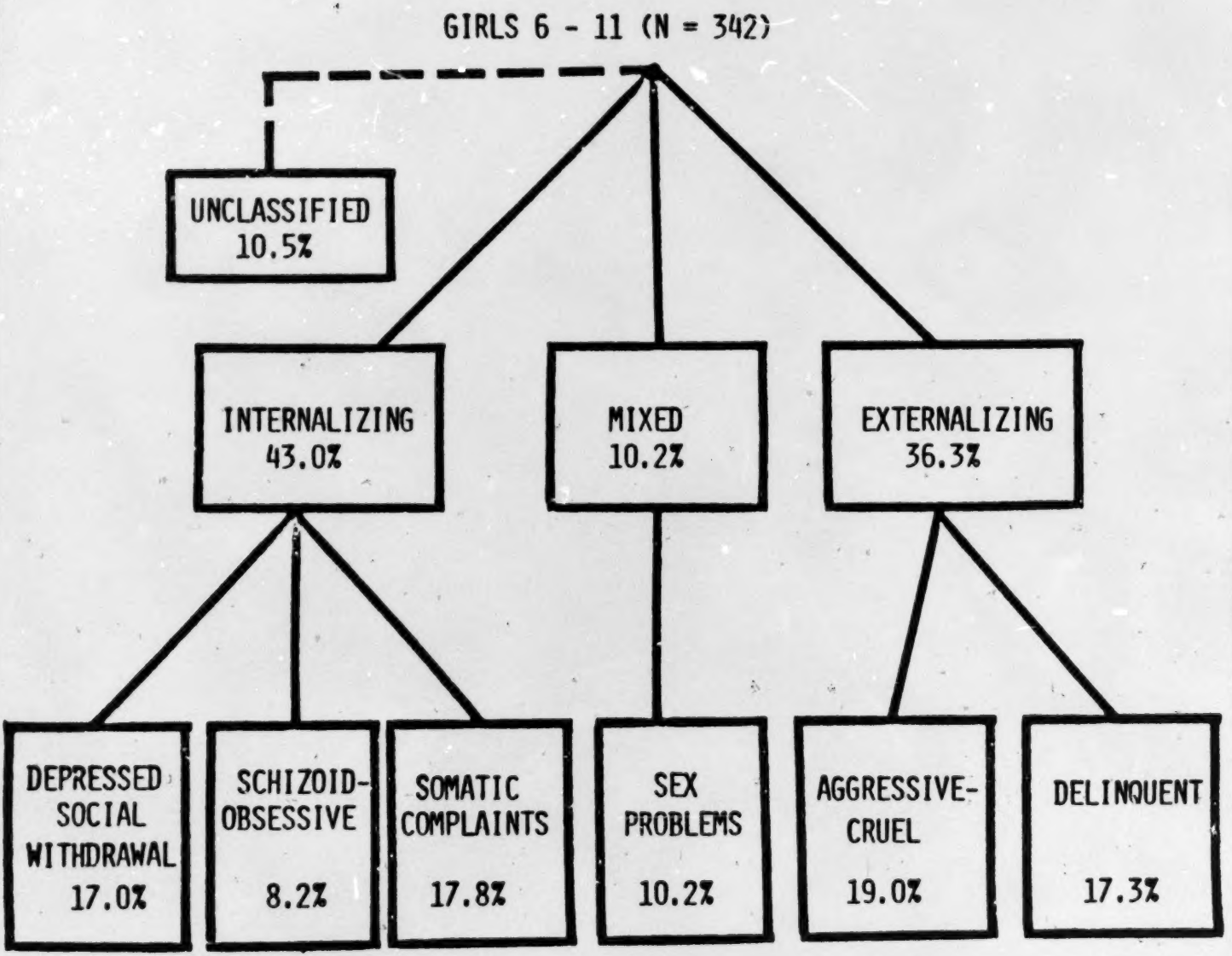
Slide 4. The "Depressed Social Withdrawal Aggressive" Profile type for boys aged 6-11.



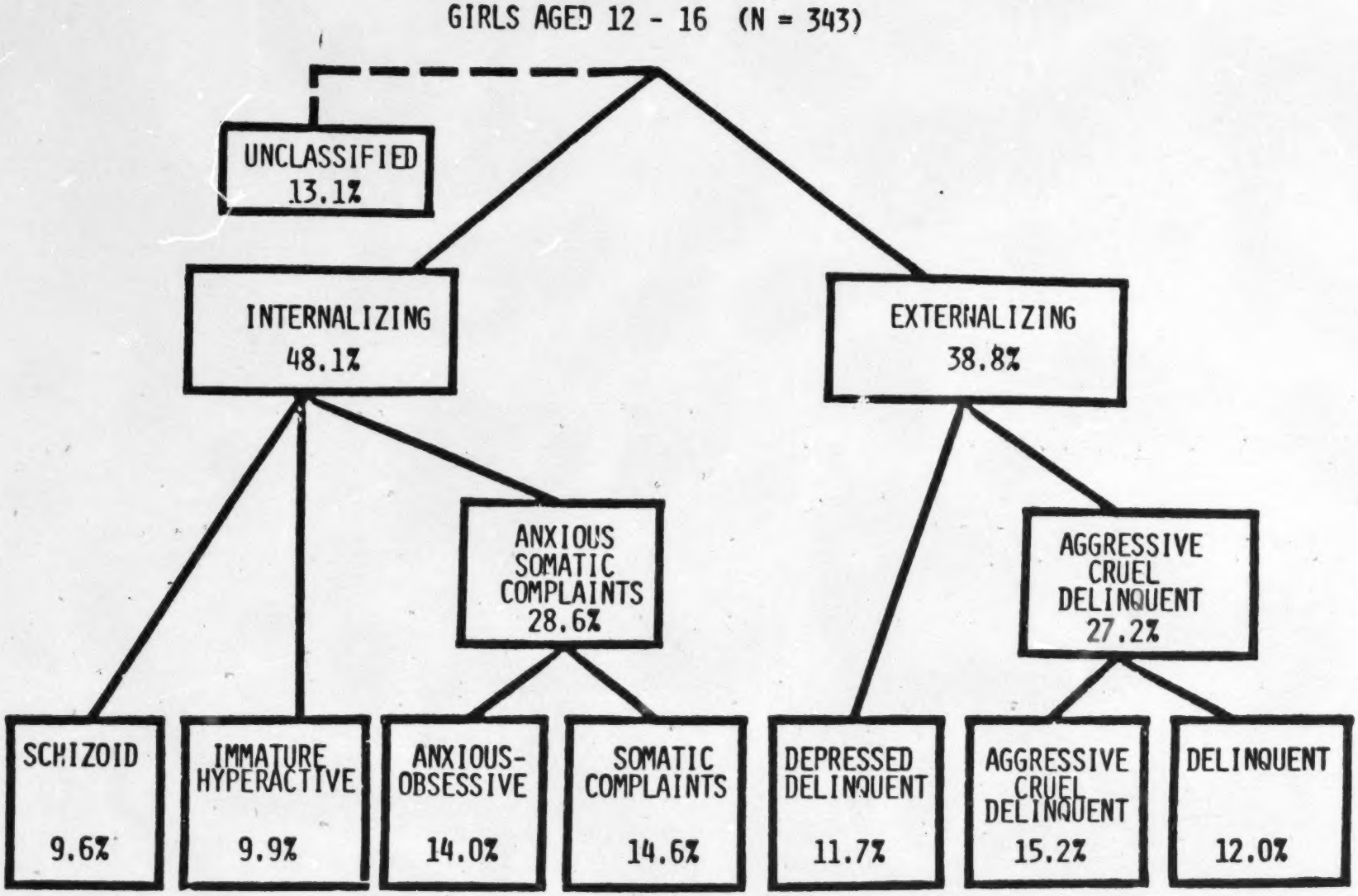
Slide 5. Distribution of Child Behavior Profile types among boys aged 6 - 11.



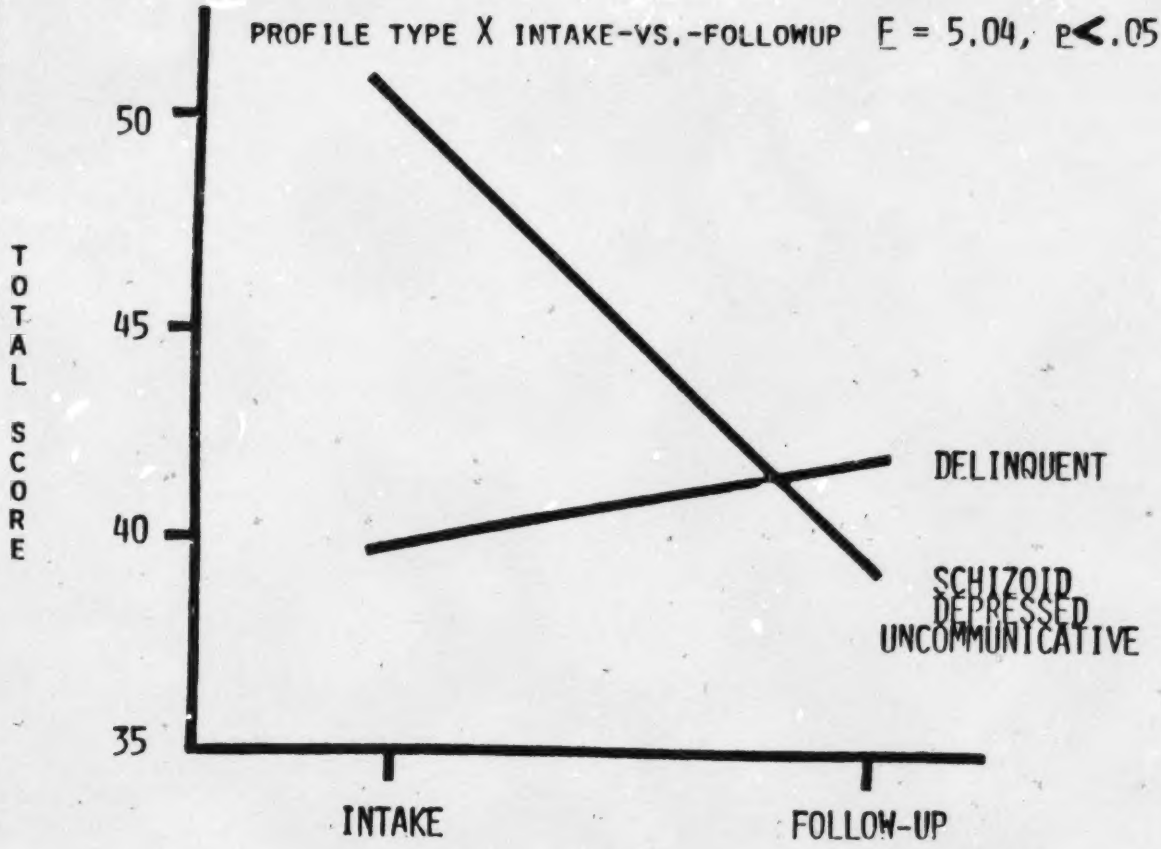
Slide 6. Distribution of Child Behavior Profile types among boys aged 12-16.



Slide 7. Distribution of Child Behavior Profile types among girls aged 6-11.



Slide 8. Distribution of Child Behavior Profile types among girls aged 12-16.



Slide 9. The interaction between Profile type and total number of problems reported at intake vs. 6 month followup for boys aged 6-11.